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09/854,031	05/11/2001	Aaron Kershenbaum	YOR920010421US1	8153

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Intellectual Property Law Dept.
IBM Corporation
P.O. Box 218
Yorktown Heights, NY 10598

EXAMINER

KIM, JUNG W

ART UNIT	PAPER NUMBER
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2132

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/854,031	Applicant(s) KERSHENBAUM ET AL.	
	Examiner Jung W Kim	Art Unit 2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-100 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-100 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

1. Claims 1-100 have been examined.

Claim Objections

2. Claim 80 is objected to because of the following informalities: the claim is not grammatical. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6, 7, 10, 20, 21, 24, 37, 38, 41, 50, 60, 61, 64, 65-69, 71, 73-81, 87 and 88 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The terms "useful" and "beneficial" in claims 50, 60, 61, 71, 81, 87 and 88 are relative terms which render the claims indefinite. The terms "useful" and "beneficial" are not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The resource used by the program has been rendered indefinite by the use of the terms.

6. As per claims 6, 7, 10, 20, 21, 24, 37, 38, 41, 64, 65-69 and 73-80, the presence of the trademarks or trade names "JAVA" and "C#" and explicit references to methods, classes and packages defined as part of the JAVA Security Architecture are not proper under 35 U.S.C. 112, second paragraph (see 37 CFR 2173.05(u)).

7. If trademarks or trade names, or names of a method, class or package are used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of the 35 U.S.C. 112, second paragraph. Ex parte Simpson, 218 USPQ 1020 (Bd. App. 1982). The scope of the claims is uncertain since a trademark or trade name, or name of a method, class or package cannot be used properly to identify any particular material or product.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-5, 11-19, 25-36, 42-50, 59-62, 70-72 and 82-100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nyanchama "The Role Graph Model and Conflict of Interest" (hereinafter Nyanchama) in view of Schmidt "Data Flow Analysis is Model Checking of Abstract Interpretations" (Hereinafter Schmidt).

11. As per claim 1, Nyanchama teaches a method comprising employing a computer for:

- a. obtaining a system defined by a set of authorizations;
- b. providing a graph representing the system defined by a set of authorizations;
- c. identifying any authorization resources associated in the graph as nodes;
- d. locating any bounded path within the graph; and
- e. associating the any authorization resources with the any bounded path.

See Nyanchama, pages 10-15, section 4, 'Role Graph Administration Algorithms'; Figure 2; Table 1; pages 5-9, section 2, definitions and reference model, 'Privileges', 'Roles', 'Authorization', 'Policies'.

12. Nyanchama does not expressly teach translating a collection of code into a graph for analysis. Schmidt teaches translating a program into a graph to perform model

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checking. See Schmidt, pages 39-41, section 3, 'Trace-Based Abstract Interpretation'; pages 41-42, 'Collecting Semantics'; pages 43-44, section 6, 'Why a Data-Flow Analysis is a Model Check'. It would be obvious to one of ordinary skill in the art at the time the invention was made to translate a program into a graph to analyze the state of the program as known to one of ordinary skill in the art and as taught by Schmidt. Ibid. The aforementioned cover the limitations of claim 1.

13. As per claim 2, Nyanchama covers a method as outlined above in the claim 1 rejection under 35 U.S.C. 103(a). In addition, the collection of code includes codes obtained from a group of codes including basic blocks, class methods, classes, collections of classes or any combination of these. See Nyanchama, page 5, 2nd full paragraph and 4th full paragraph; see Schmidt, page 39, last paragraph; page 41, section 4, 'Collecting Semantics' and Figure 2. The aforementioned cover the limitations of claim 2.

14. As per claim 3, Nyanchama covers a method as outlined above in the claim 1 rejection under 35 U.S.C. 103(a). In addition, the step of providing includes constructing the program graph through static analysis techniques (abstract interpretations). See Schmidt, page 39, section 2, last paragraph. The aforementioned cover the limitations of claim 3.

15. As per claim 4, Nyanchama covers a method as outlined above in the claim 3 rejection under 35 U.S.C. 103(a). In addition, employing object code or any intermediary state of a program is the standard means of constructing graphs to analyze the model of a program. For example, compiler programs translate source code into object code to perform optimizations on the code. Examiner takes Official Notice of this teaching. It would be obvious to one of ordinary skill in the art at the time the invention was made to employ object code to construct the program graph so that analysis of the program will be based on object code rather than source code, which is geared to human-readability. The aforementioned covers the limitations of claim 4.

16. As per claim 5, Nyanchama covers a method as outlined above in the claim 1 rejection under 35 U.S.C. 103(a). In addition, the step of identifying includes finding at least one authorization point in the program graph. See Nyanchama, page 11, Table 1, 'direct privileges' and 'effective privileges'. The aforementioned cover the limitations of claim 5.

17. As per claim 11, Nyanchama covers a method as outlined above in the claim 1 rejection under 35 U.S.C. 103(a). In addition, the step of identifying includes employing data flow analysis. See Schmidt, page 39, section 2, last paragraph, 2nd sentence. The aforementioned cover the limitations of claim 11.

18. As per claim 12, Nyanchama covers a method as outlined above in the claim 11 rejection under 35 U.S.C. 103(a). In addition, the step of employing includes generating a data flow from the program graph. See Schmidt, page 40, Figure 1. The aforementioned cover the limitations of claim 12.

19. As per claim 13, Nyanchama covers a method as outlined above in the claim 1 rejection under 35 U.S.C. 103(a). In addition, the step of identifying any bounded path includes locating a set of start nodes in the program graph, and locating a stop node in the program graph; and the bounded path includes all nodes within the graph bound by the start nodes and the stop node. See Schmidt, page 40, Figure 1, 'Concrete computation tree'. The aforementioned cover the limitations of claim 13.

20. As per claim 14, Nyanchama covers a method as outlined above in the claim 1 rejection under 35 U.S.C. 103(a). In addition, the step of associating includes associating and aggregating the any authorization resource with the collection of code. See Nyanchama, page 5, section 2.1, 'Privileges'; page 9, section 3, 'Role Graphs'; page 11, Figure 2. The aforementioned cover the limitations of claim 14.

21. As per claims 15-19 and 25-28, they are claims corresponding to claims 1-5 and 11-14, and they do not teach or define above the information claimed in claims 1-5 and 11-14. Therefore, claims 15-19 and 25-28 are rejected as being unpatentable over

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Nyanchama in view of Schmidt for the same reasons set forth in the rejections of claims 1-5 and 11-14.

22. As per claims 29 and 31, they are claims covered by the inventions outlined in the claim 1-5 and 11-14 rejections, and they do not teach or define above the information in the claim 1-5 and 11-14 rejections. Therefore, claims 29 and 31 are rejected as being unpatentable over Nyanchama in view of Schmidt for the same reasons set forth in the rejections of claims 1-5 and 11-14.

23. As per claim 30, Nyanchama covers a method as outlined above in the claim 29 rejection under 35 U.S.C. 103(a). In addition, a step that provides an indication that operations dependent on a property are not necessary when the property has not been identified or is not identified is a standard coding practice. This step prevents superfluous operations. Examiner takes Official Notice of this teaching. It would be obvious to one of ordinary skill in the art at the time the invention was made to provide an indication that authorization testing is not necessary when no resource is identified by the method to make for a more efficient method as known to one of ordinary skill in the art. The aforementioned cover the limitations of claim 30.

24. As per claims 32-36, 42 and 43, Nyanchama covers an apparatus as outlined above in the claim 15-19 and 25-28 rejections under 35 U.S.C. 103(a). In addition, a means to identify any authorization resources within the collection of code is an

authorization resource identifier; a means to locate any bounded path within a program graph of the collection of code is a bounded path locator; a means to associate any authorization resource with the any bounded path is an associator; and a means to construct the program graph is a program graph constructor. The aforementioned cover the limitations of claims 32-36, 42 and 43.

25. As per claims 44-46, they are claims corresponding to claims 29-36, 42 and 43, and they do not teach or define above the information claimed in claims 29-36, 42 and 43. Therefore, claims 44-46 are rejected as being unpatentable over Nyanchama in view of Schmidt for the same reasons set forth in the rejections of claims 29-36, 42 and 43.

26. As per claims 47-49, they are claims corresponding to claims 29-36, 42 and 43, and they do not teach or define above the information claimed in claims 29-36, 42 and 43. Therefore, claims 47-49 are rejected as being unpatentable over Nyanchama in view of Schmidt for the same reasons set forth in the rejections of claims 29-36, 42 and 43.

27. As per claims 50, 59-62 and 70-72, they are claims corresponding to the inventions outlined in the claim 1-5 and 11-14 rejections, and they do not teach or define above the information outlined in the claim 1-5 and 11-14 rejections. Therefore,

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claims 50, 59-62 and 70-72 are rejected as being unpatentable over Nyanchama in view of Schmidt for the same reasons set forth in the rejections of claims 1-5 and 11-14.

28. As per claims 82-91, they are claims corresponding to the inventions covered by the claim rejections as listed above, and they do not teach or define above the information outlined. Therefore, for the reasons listed above, claims 82-91 are rejected as being unpatentable over Nyanchama in view of Schmidt.

29. As per claims 92-100, they are article of manufacture claims, computer program product claims, and program storage device claims corresponding to the inventions outlined in the claim 1-5, 11-19, 25-36, 42-50, 59-62, 70-72 and 82-91 rejections, and they do not teach or define above the information outlined in the claim 1-5, 11-19, 25-36, 42-50, 59-62, 70-72 and 82-91 rejections. Therefore, claims 92-100 are rejected as being unpatentable over Nyanchama in view of Schmidt for the same reasons set forth in the rejections of claims 1-5, 11-19, 25-36, 42-50, 59-62, 70-72 and 82-91.

30. Claims 6-10, 20-24, 37-41, 52-58, 63-69 and 73-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nyanchama in view of Schmidt, and further in view of Gong "Java Security Architecture (JDK 1.2)" (hereinafter Gong).

31. As per claims 6-9, Nyanchama covers a method as outlined above. Nyanchama does not expressly teach using JAVA and the JAVA Security Architecture to determine

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authorization points. Gong discloses a package to check for access authorization of a code using an AccessController object. See Gong, pages 31-33, section 4.2, `java.security.AccessController`. Further, methods that instantiate an AccessController object and call the `checkPermission()` method are finding authorization points.

Moreover, the function call to invoke the AccessController methods is an instruction invocation. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made for the program to be a JAVA program and for the steps to find an authorization point be implemented using the JAVA Security Architecture since JAVA has become a widely used language to create OO programs and Sun Microsystems has provided the JAVA Security Architecture to secure programs written in the JAVA language. See Gong, page 1, Introduction. The aforementioned cover the limitations of claims 6-9.

32. As per claim 10, Nyanchama covers a method as outlined above in the claim 6-9 rejections under 35 U.S.C. 103(a). In addition, C# is another popular OO programming language provided by MICROSOFT. Hence, it would be obvious to one of ordinary skill in the art at the time the invention was made for the particular language to be C#, since C# offers many of the modularity benefits of the JAVA language as known to one of ordinary skill in the art. The aforementioned cover the limitations of claim 10.

33. As per claims 20-24, they are claims corresponding to claims 6-10, and they do not teach or define above the information claimed in claims 6-10. Therefore, claims 20-

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24 are rejected as being unpatentable over Nyanchama in view of Schmidt and Gong for the same reasons set forth in the rejections of claims 6-10.

34. As per claims 37-41, they are claims corresponding to claims 20-24, 32-36, 42 and 43, and they do not teach or define above the information claimed in claims 20-24, 32-36, 42 and 43. Therefore, claims 37-41 are rejected as being unpatentable over Nyanchama in view of Schmidt and Gong for the same reasons set forth in the rejections of claims 20-24, 32-36, 42 and 43.

35. As per claims 52 and 53, Nyanchama covers a method as outlined above in the claim 6-10 and 50 rejections under 35 U.S.C. 103(a). In addition, the step of constructing includes the step of building an invocation graph and a call graph of the collection of code to form the program graph. See Schmidt, page 40, Figure 1 and page 41, Figure 2; see Gong, pages 31-32, 3 bullets. The aforementioned cover the limitations of claims 52 and 53.

36. As per claims 54-58, Nyanchama covers a method as outlined above in the claim 52 and 53 rejections under 35 U.S.C. 103(a). In addition, the JAVA Security Architecture enables authorization identification using context-sensitivity (see Gong, page 37, section 4.3, 'Inheritance of Access Control Context'), wherein context sensitivity includes using type information for any method receiver and/or any parameter (see Gong, pages 30-31, section 4.1: a class belongs to one protection domain);

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wherein the step of using type information includes using class and memory allocation site information which includes using per instance information (objects passed by reference as a method parameter are instantiated classes in JAVA). Furthermore, this instance information is associated with a node or edge in the program graph. See Nyanchama, page 11, Figure 2: only allocated resources have a definite authorization level. The aforementioned cover the limitations of claims 54-58.

37. As per claims 63 and 64, they are claims corresponding to claims 6-10 and 50, and they do not teach or define above the information claimed in claims 6-10 and 50. Therefore, claims 63 and 64 are rejected as being unpatentable over Nyanchama in view of Schmidt and Gong for the same reasons set forth in the rejections of claims 6-10 and 50.

38. As per claims 65-69 and 73-81, Nyanchama covers a method as outlined above. In addition, the JAVA Security Architecture enables a resource identifier to include at least one `java.security.Permission` object (see Gong, pages 8-9, sections 3.1 and 3.1.1; page 39, '`acc.checkPermission(permission)`'); wherein the authorization test is a call to any `java.security.AccessController.checkPermission()` method (see Gong, page 31-32, section 4.2, three bullets); wherein the location represents a call to any authorization testing method in any instance of `java.lang.SecurityManager` and/or one of its subclasses (see Gong, page 45, section 6.2 and by the property of JAVA class inheritance); wherein the node has a parameter which the type information is a JAVA

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java.security.Permission (see Gong, page 39, 'acc.checkPermission(permission)'); wherein the step of identifying includes locating the constructor for the JAVA java.security.Permission allocation site and using the data flow analysis in identifying any value passed by any parameter to the constructor, wherein the combination of the JAVA java.security.Permission and a value for any parameter is the used Permission (see Gong, page 33-34, section 4.2.1, 'Algorithm for Checking Permissions'; pages 38-40, section 4.4; see Schmidt, pages 41-42, section 4, 'Collecting Semantics'); wherein the method further comprising employing a privileged JAVA code wherein the stop node represents the method java.security.AccessController.checkPermission(), and employing the start nodes are any of the root nodes in the program graph or a node representing the method java.security.AccessController.doPrivileged(), and connecting a used Permission with the privileged JAVA code (see Gong, pages 33-34, section 4.2.1 'Algorithm for Checking Permissions', especially page 33, last paragraph; page 35, 3rd paragraph, 'normal use of the "privileged" feature'); wherein the step of associating includes connecting a used Permission with any node in the program graph prior to the java.security.AccessController.doPrivileged() node (see Gong, pages 33-34, section 4.2.1 'Algorithm for Checking Permissions': a caller whose domain is granted the permission must be marked as "privileged"); wherein the step of associating includes connecting a used Permission for each java.security.AccessController.checkPermission() in the program graph (Permission object is a necessary parameter to call the checkPermission method); wherein the step of associating includes connecting the used Permission from each node in the program

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graph to each method and from each method to each class and from each class to a collection of classes (see Schmidt, page 11, Figure 2; see Gong, page 6, Figure; pages 8-9, section 3.1-3.1.3); and wherein the method further comprising employing the useful resource in executing the collection of code (see Gong, page 35, 'somemethod()'). The aforementioned cover the limitations of claims 65-69 and 73-81.

39. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nyanchama in view of Schmidt, and further in view of Laskoski U.S. Patent No. 5,428,554 (hereinafter Laskoski).

40. As per claim 51, Nyanchama covers a method as outlined above in the claim 50 rejection under 35 U.S.C. 103(a). Nyanchama does not expressly disclose the step of constructing including employing source code of the collection of code. Laskoski teaches employing source code to form a directed graph. See Laskoski, col. 2, lines 30-35. It would be obvious to one of ordinary skill in the art at the time the invention was made to employ source code of the collection of code to construct a program graph to improve a programmer's comprehension of program resource allocation within the collection of code. See Laskoski, col. 1, lines 1-5. The aforementioned cover the limitations of claim 51.

Conclusion

41. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cline et al. U.S. Patent No. 5,313,616.

Koved U.S. Patent No. 5,915,085.

Hunt U.S. Patent No. 6,381,735.

Scheifler U.S. Patent No. 6,389,540.

Gong U.S. Patent No. 6,192,476.

Gong U.S. Patent No. 6,125,447.

Scheifler et al. U.S. Patent No. 6,138,238.

Gong U.S. Patent No. 6,047,377.

Gong U.S. Patent No. 6,044,467.

Gong "Implementing Protection Domains in the JAVA Development Kit 1.2".

Telephonic Inquiry Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jung W Kim whose telephone number is (703) 305-8289. The examiner can normally be reached on M-F 9:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on (703) 305-1830. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jung W Kim
Examiner
Art Unit 2132

Jk
October 6, 2004



GILBERTO BARRON
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100